*lævi, nitidâ, longitudinaliter substriatâ, albidâ, fasciis cinerescentibus maculisque fuscis ornatâ; labio calloso, anticè uniplicato; labri margine incrassato, flexuoso, in medio producto.*

*Hab.* Philippines. Mus. Cuming.

5. Aciculina maculata, A. Adams. *A. testâ turritâ, lævi, nitidâ, albâ, maculis luteo-fuscis longitudinalibus ornatâ, transversim sulcatâ, sulcis distantibus; labio calloso, anticè producto; columellâ uniplicatâ; labro extus marginato, intus lirato.*

*Hab.* Banang, Sargassinan, isle of Luzon, muddy sand, low water (*H. C.*). Mus. Cuming.

6. Aciculina vittata, A. Adams. *A. testâ turritâ, albidâ, nitidâ, fasciâ transversâ fuscâ interruptâ ornatâ, transversim sulcatâ, longitudinaliter costatâ; labio calloso; columellâ bituberculatâ, et anticè valde uniplicatâ; labro extus varicoso, intus dentato-lirato.*

*Hab.* Ticao, coral sand, 6 fathoms (*H. C.*). Mus. Cuming.

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## MISCELLANEOUS.

### *On the Nervures of Leaves and their Distribution.*

By L. von Buch.

Fossil leaves can frequently only be studied in their form and neuration. The nervures have unfortunately been little noticed by botanists, as though they were of but little importance, and the laws which rule their numerous modifications have not yet been traced. It is to be regretted that, even in the best figures, the characters of the neuration of the leaves are badly represented, and sometimes even in contradiction to the laws of nature. This is the case not only with fossil, but also with living plants. I wish to draw the attention of botanists to this subject, and shall confine myself to some leaves of dicotyledonous plants which are readily procured for examination.

A leaf is an organ essential to the life of the plant. In its development it relinquishes the cylindrical form of the branches and twigs, and extends itself into a flat plate, one surface of which is turned towards the earth and the other to the sky. On the lower surface are the stomata which absorb carbonic acid from the air, decompose it, and set oxygen at liberty. Now this part of the leaf could not be developed, still less could it maintain itself in this extended condition, without the strong network of nervures which are found beneath the leaf. *The number of these nervures is fixed for each leaf; even for each species.* If the leaf grows extraordinarily, new nervures do not appear on this large surface; the number of nervures was fixed even in the closed bud. The irregularities in number in the bud are confined within such narrow limits, that they are of no importance in

regard to the quantity of nervures. It is consequently necessary to indicate and fix this number in every drawing or description of a fossil leaf; without it new species cannot be determined.

When the secondary nervures of a simple leaf go from the central nervure to the margin or even a little beyond the parenchyma, these are nervures running towards the margin (*Randläufer*).

They are simple when the first pair of secondary nervures above the petiole is without tertiary nervures, as in the beeches, in *Alnus glutinosa* and *Castanea vesca*. If tertiary nervures arise from the lower side of the first secondary nervures, these are *winged* nervures.

The nervures however do not always attain the margin of the leaf. Very frequently they stop at a certain distance from the margin with so much constancy and regularity that they form a new and very extensive division which is capable of many subdivisions. This constitutes the system of *arched nervures*. Two neighbouring nervures are bent towards one another and united in an elegant arch so exactly, that it is only possible by close observation to ascertain where one stops and the other commences. Nevertheless, at the point of union there is always a small elevation, from which, usually close to the superior nervure, a common nervure arises, which goes to the margin of the leaf and terminates in a point or tooth of the margin. The superior nervure sends a branch downwards; but the essential branch curves upwards to join the secondary nervure next above it in a similar arch; this continues to the apex of the leaf. A series of continuous arches is formed, sometimes ten or more in succession. The lines of the folds of the leaf divide these arches in the middle, but do not attain the margin. This pretty form of neuration is one of the most common in our plants. It is exhibited in the *Hieracia*, the *Dipsaceæ*, and very distinctly in the *Epilobium angustifolium*; it is also met with in many shrubs and trees, such as the walnut, orange and lemon trees, and the holly. In tropical plants with projecting ribs it is always the case: drawings allow one to trace the course of the nervures, except that they do not indicate their continuation to the margin.

The nervures running towards the apex (*Spitzläufer*) are not less striking. In these the lateral nervures run in elegant curves from the base between the margin and the central nervure, uniting again with this nervure at or near the apex. In the latter case some more secondary nervures separate from the central rib, the last pair of which reunite with it at the point. The first are *complete*, as in nearly all the *Caryophylleæ*, in many species of *Laurus* and *Zizyphus*. The second are *incomplete*, as in *Cornus*, *Philadelphus* and *Ceanothus*.

Another neuration is especially exhibited by tropical plants; in this the nervure follows the margin from base to apex, completely surrounding the leaf and terminating exactly at the apex. Secondary nervures can scarcely ever attain the margin. They are generally very near one another and very fine; they divide and lose themselves in the nervures of the circumference. These are marginal nervures (*Saumläufer*). This form belongs to most of the *Myrtaceæ* and the *Banksiæ*; it is also probably that of *Buxus*.

There is evidently a multitude of other forms of neuration, which must be associated with the preceding. They ought to form the subject of a special work. It is only by this means that the apparent exceptions can be explained; such as the secondary nervures of *Oxyacantha*, *Galeopsis*, and *Euphrasia*, which do not terminate at the apex, but in the notches; the tertiary nervures of the *Ranunculi*; or the circumscription of the notches by the tertiary nervures in many species of *Acer*, with other analogous phænomena.

The above-mentioned forms, which are undoubtedly the most common, may be grouped as follows:—

Leaves are either *simple*, *digitate* or *pinnate*.

Simple leaves, which are composed only of one plate, have their neuration,—

A. Running towards the margin (*Randläufer*); when the nervures run from the central rib to the margin and terminate there; these are—

*a*. Simple, when no tertiary nervures arise from the secondary nervures.

*b*. Compound, when there are tertiary nervures.

B. Arched (*Bogenläufer*). Each pair of secondary nervures uniting to form an arch.

C. Running towards the apex (*Spitzläufer*). Two inferior secondary nervures running between the margin and the central rib to attain the apex of the leaf;—

*a*. *Complete*, when the two nervures actually reach the apex.

*b*. *Incomplete*, when the two nervures do not reach the apex.

D. Marginal (*Saumläufer*). The two lateral nervures of the base running towards the apex, following the margins throughout.—*Bibl. Univ. de Genève*, Oct. 1852, p. 161.

*On the Occurrence of large quantities of the Shells of* Anodo cygnea *on the sea-coast near Sandgate.* By Francis Brent, Esq.

Sandgate, March 21, 1853.

My dear Gray,—I noticed a curious circumstance this evening:—in walking by the sea-shore I perceived large quantities of the shells of *Anodonta cygnea* strewn along the beach,—either washed up at the top of high-water mark, or mixed with the drift weeds and rubbish. Nearly every specimen was more or less imperfect; in most instances one valve only, and part of the other remained; in many cases, however, there was a singular perforation of about a quarter of an inch in diameter in one of the valves, and in some instances both valves were perfect, but in those cases part of the muscles that open and close the shells remained. The quantity was so great, that in the distance of a mile I could certainly have collected a waggon-load. Now as this mollusk inhabits only fresh water, how comes it that so large a quantity should be found on the sea-coast? I can only account for the circumstance by the supposition that they had been brought there by birds, probably Royston crows, which, during the